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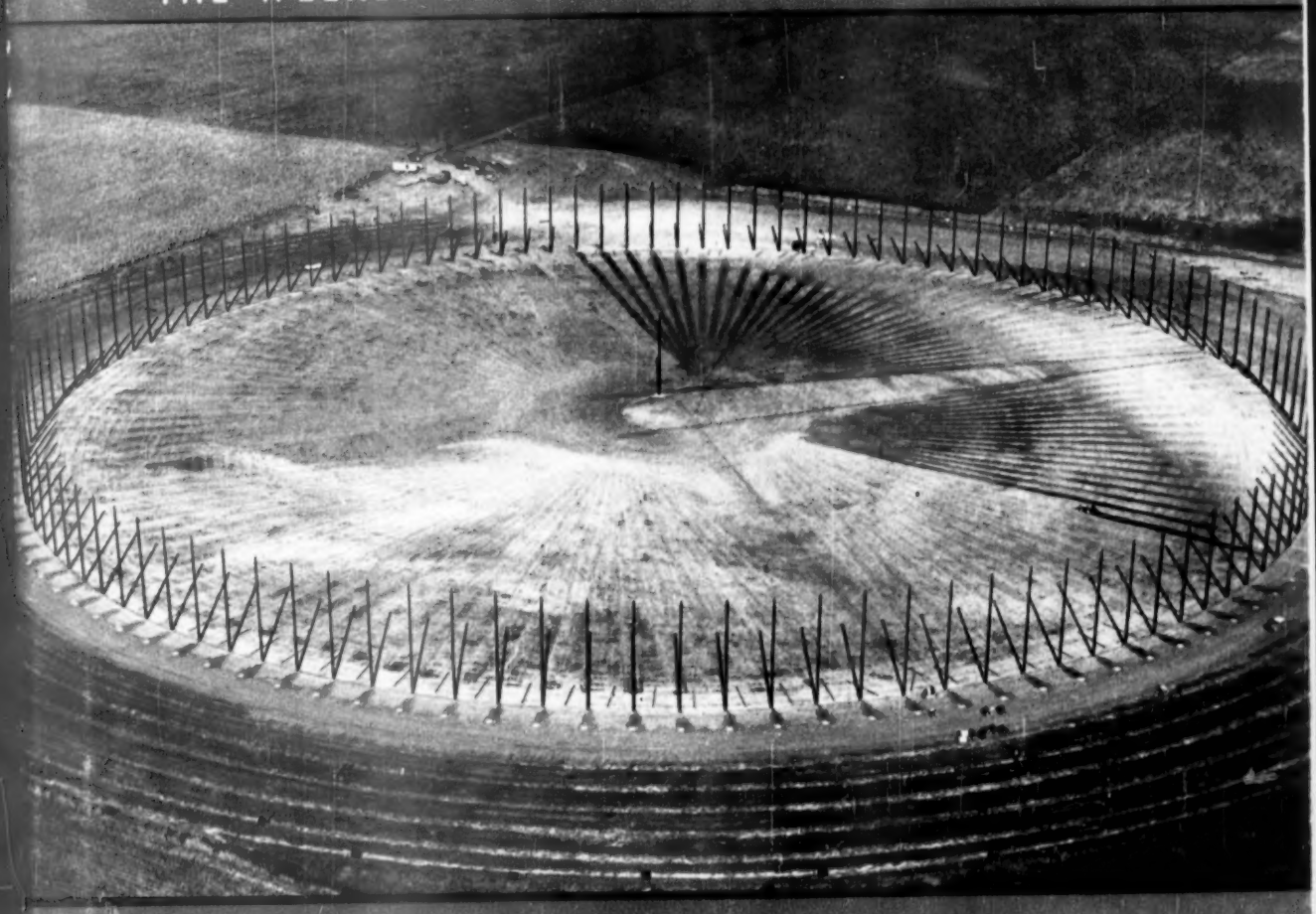
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Direction Finder

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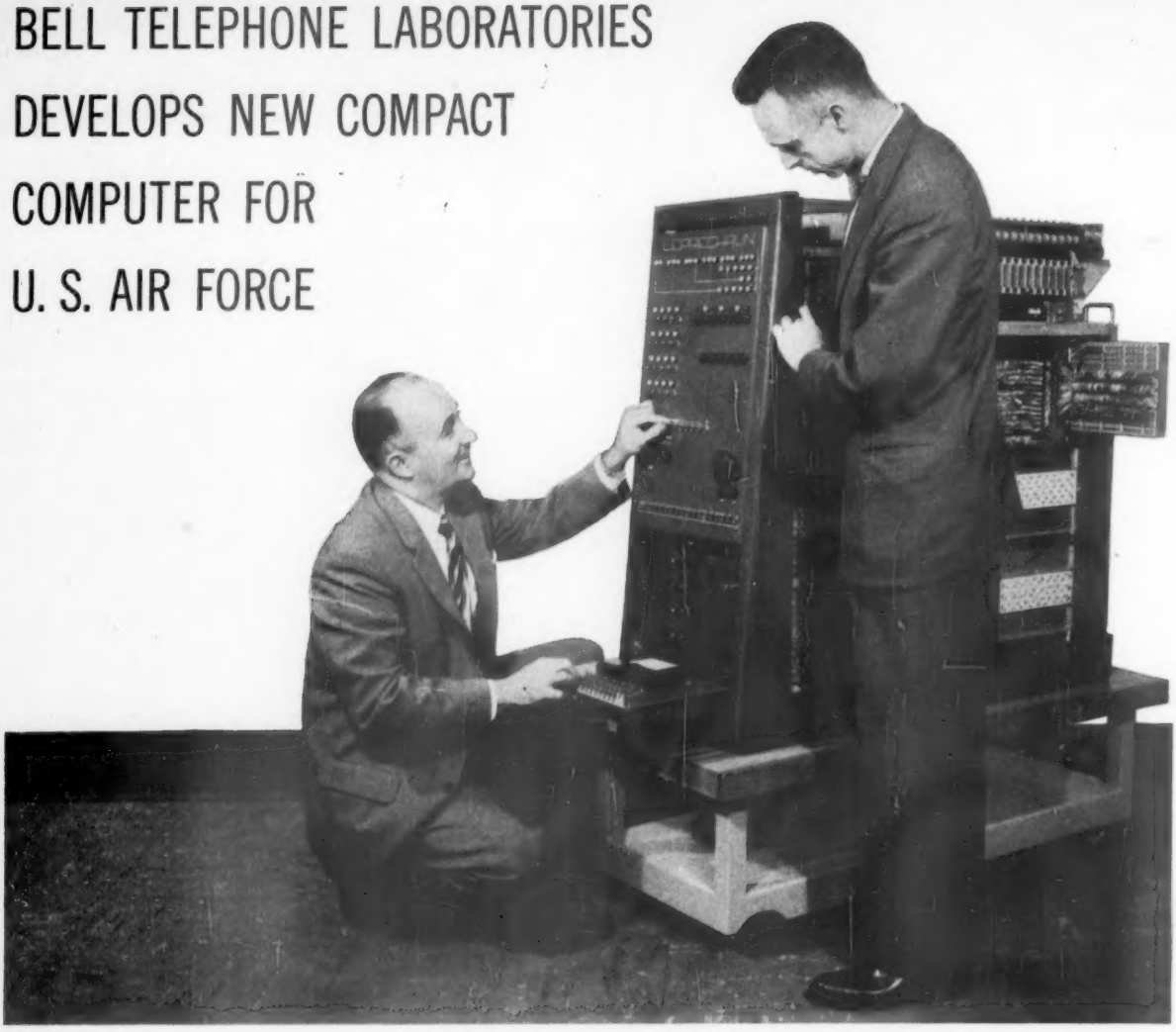
A SCIENCE SERVICE PUBLICATION

BELL TELEPHONE LABORATORIES DEVELOPS NEW COMPACT COMPUTER FOR U. S. AIR FORCE



J. A. Githens, B.S. in E.E., Drexel Institute of Technology, and J. A. Baird, Ph.D. in E.E., Texas A. & M., check the control panel of Leprechaun, a new high-speed computer which solves extremely complex problems in one-tenth of a second. Small size and low power are made possible by new design principles and Bell Laboratories' invention of the transistor.

The United States Air Force assigned Bell Labs an interesting assignment: develop a new kind of electronic computer. The major requirement was greater simplicity. Of course, no computer is simple, but this one (known as "Leprechaun" to its designers) is much smaller and simpler than most of the computers currently in use.

It has only some 9000 electrical components; 5000 of them are transistors. As a result, Leprechaun has less than one-third the components of conventional computers. This facilitates testing, experimentation, assembly and service.

Even in its experimental state, Leprechaun is a stimulating example of great strides in the simplification and miniaturization of circuitry . . . a problem of profound interest to all Bell Laboratories researchers as they develop radically new equipment for your future telephone service.

BELL TELEPHONE LABORATORIES

WORLD CENTER OF COMMUNICATIONS RESEARCH AND DEVELOPMENT

GENERAL SCIENCE

Red "Moons" Over-Rated

The most important scientific events of the past year were not the launching of the sputniks, but rather more basic research in other fields of science, many scientists believe.

➤ THE SPUTNIKS are not the most important scientific and technological advances of the year in the opinion of many of some five thousand scientists that gathered for the 124th meeting of the American Association for the Advancement of Science.

Dr. Wallace R. Brode, president-elect of this largest of general science organizations in the nation, feels many advances being made in biology, human relations and phases of physical science unrelated to missiles, rockets and satellites are far more important than the sensational Russian satellites. Dr. Brode, who is associate director of the National Bureau of Standards, Washington, rates as the prime 1957 achievement the demonstration that the conservation of parity or the "invariance of spatial inversion" is not rigorously true at the nuclear level.

Just as the Einstein theory of relativity, which was also difficult for the non-scientist to understand, had a profound influence upon the progress of science and philosophy, so this Nobel prize winning reversal of a previously accepted law of matter is expected to influence the future.

The retiring AAAS president, Dr. Paul B. Sears of Yale University, a leading conservationist, discussed space in his address to the Association. But it was not the kind of space concerned with rockets and satellites. It was space on the surface of the earth, the terrestrial space in which man lives. Our future, in his opinion, depends far less upon outer space than upon the land we use.

The quality of the space on the earth's surface rather than the area is the prime consideration, Dr. Sears points out.

One of the most significant things about modern science, Dr. Sears feels, is that demography and ecology or other science specialties have given us the means of projecting the future utilization of our resources and the ability to form an estimate of the direction of the future of our human adventure. This allows man to make adequate arrangements for the centuries to come.

Artery Disease

➤ A NEW CAUSE, hormone imbalance, has been found for polyarteritis nodosa, a usually fatal disease that creates dangerous lumps or nodules inside artery walls.

This was reported by Dr. James C. Perry, Marquette University, Milwaukee, Wis., to the Association.

Polyarteritis nodosa is a disease in which there is first an inflammatory reaction in the smaller arteries. This reaction continues to become worse and later spreads to the larger arteries. The thickened artery walls break down and become plugged with dead cells, forming the characteristic nodules. Extensive damage is done to many of the body's organs and when the arteries of either the lungs, heart, kidneys or abdomen are hit, recovery is rare.

The disease was accidentally produced in male rats by giving them female sex hormone first to eliminate their sperm production, and then a hormone from the pituitary gland, follicle stimulating hormone (FSH), in an attempt to speed up the normally slow recovery of sperm cell production. The results of giving FSH revealed an entirely different reaction than expected, the development of polyarteritis nodosa, Dr. Perry reported.

Further studies of the animals showed that when the disease developed large tumorous cells appeared in the pituitary gland at the same time. Although these tumors never spread, other tumors were also found in the adrenal glands. These adrenal tumors increased in size as the disease progressed. If the pituitary gland is removed either before or after treatment with the two hormones, the polyarteritis does not develop nor do tumors appear in the adrenal glands.

It appears that the tumorous pituitary causes the tumors in the adrenal glands, and these in turn cause polyarteritis, Dr. Perry concluded.

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MEDICINE

Chest Movements Used To Record Heart Sounds

➤ HEART murmurs that have gone unnoticed before are now being "heard" by a device that records tiny movements of the chest wall.

The device is known as a capacitance heart sound pickup and was developed by Dr. Dale Groom, Medical College of South Carolina, Charleston, and Yro T. Sihvonen, General Motors Corporation, Detroit, Mich. Its use may enable heart researchers to spot defects in heart valves at an earlier stage than has been possible before.

The capacitance device is contained in a small bell-shaped housing similar to the "bell" of the physician's stethoscope. It converts chest wall vibrations directly into electrical signals.

These are then amplified and reproduced with a clear trace on an oscilloscope where they can be photographed, or they can be recorded on tape.

The main advantage of the device is its greater sensitivity. It brings out many "normal" murmurs and sounds produced by the flow of blood through the heart and blood vessels that are not audible on ordinary stethoscopic examination.

The heart sounds of an unborn child can also be picked up and recorded at an earlier stage of development than before.

The capacitance principle has been known and used throughout industry for many years. It utilizes the variation that occurs in electrical capacitance between two charged conductors as the relative distance between them is changed.

With the device, the skin on the chest serves as one electrode and the other electrode is suspended a fraction of an inch above the skin surface, inside the pickup.

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HEART SOUND PICK-UP—To detect and record heart murmurs that may reveal heart valve defects earlier than was possible before, this device, in its small bell housing on the patient's chest wall, is being used for research in a soundproof room at Medical College Hospital, Medical College of South Carolina, Charleston.

PUBLIC HEALTH

Smoking-Cancer Link Weak

The controversy over whether or not smoking causes lung cancer still wages, with a British scientist maintaining that there is no conclusive evidence showing a causal relationship.

➤ THE PRESENT evidence linking smoking with lung cancer is "inconclusive," Sir Ronald Fisher, Arthur Balfour professor of genetics at Cambridge University, England, and a visiting professor at Michigan State University, has reported.

The British researcher told an American Association for the Advancement of Science meeting in Indianapolis, Ind., that "association is not causation."

"The evidence standing by itself is inconclusive, as it is apparently impossible to carry out properly controlled experiments with human material."

Facts about inhaling, he said, are what is needed and cited an English research study that showed the "paradoxical fact" that inhaling was less common among cancer patients than among non-cancer patients. He also called for research to determine whether or not there are genetic differences among pipe smokers, cigar smokers, cigarette smokers and non-smokers.

Additional research on the problem, Sir Ronald charged, has been delayed by "overconfidence in the belief that the solution has already been found."

Three scientists from Indiana University reported on different aspects of fluorine and the addition of fluoride to water to combat dental caries at a symposium on the physiology and pharmacology of fluorine.

Dr. Joseph C. Muhler, associate professor of basic sciences, said that fluorine was an essential dietary element. In addition to its proven effect on resistance to dental caries, it may be shown in future research that it is essential to other parts of the body, including the heart and the kidney.

Only recently, Dr. Muhler said, fluorine has been found in the soft tissues of the body such as the heart and the kidney. Although its function in these tissues is still a mystery, the finding has upset the long standing belief that fluorine is deposited only within the skeleton and teeth.

The use of fluoride, even at relatively high levels, Wolfgang Buttner, director of medical dentistry, reported, has not been shown to cause changes in the cholesterol metabolism in the rat.

Whether added fluoride to a given water supply is as effective as the naturally occurring fluoride remains to be seen, Martin J. Wagner of the department of chemistry told the symposium.

Consideration of the entire mineral content of a fluoride-deficient water as well as the effect of dietary milk and mineral supplements may be necessary before it can be expected that the addition of fluoride will produce the same long-term results in all areas as a natural fluoride water, he warned.

In another paper delivered to a meeting of the AAAS, it was reported that the same ion exchange resins used in some specialized industrial water softening and metal refining processes are being used in the laboratory to create new fuels. David W. Young and Eileen Pare, Sinclair Research Laboratories, Inc., Harvey, Ill., said traces of the resins promote a low-cost, room temperature reaction between formic acid and petroleum products. What results is a high yield of experimental fuels currently undergoing tests.

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BIOLOGY

Man Is a Modified Plant

➤ Man is a type of highly modified plant. He, and all other animals, share a common ancestry with the brown seaweeds, dating back some billion years.

This is the conclusion of Dr. Lawrence S. Dillon, associate professor of biology at Texas A & M College, College Station, Texas, who reported his "new approach to the development of life," to the American Association for the Advancement of Science meeting in Indianapolis, Ind.

Dr. Dillon and his associates decided to go one step past the 100-year-old concepts of evolution and biological classification, stemming in large part from Darwin, and study the internal cellular structures of plants and animals as a clue to the evolution of life.

Using this approach and corroborating it as far as present-day knowledge permits, Dr. Dillon said, forced the scientists to conclude "that all life belongs to only one kingdom, which in all honesty must be recognized as the Kingdom of Plants.

"Hence, all animals, including man, are in reality a type of highly modified plant life, derived a billion years or so ago from a common ancestry with the brown seaweeds."

Tracing the evolution and development of the nucleus, which in fact, Dr. Dillon noted, was absent in the earliest forms of life, led to a tree-like picture of evolution.

At the very bottom are the blue-green algae, the simplest living things. (Viruses may be simpler but their inner structure is still a mystery.) Next come the bacteria, followed by the yeasts, etc. At the top there are two branches. One branch is formed with the green algae and higher plants and the other with the yellow algae and red and brown seaweeds.

With this background, Dr. Dillon said it is possible to trace "rather exactly" the evolution of animals, from the above point of origin "with some striking results."

"For example," he said, "the removal of the sponges from the present group is shown to be mandatory, their correct relationships being with that of certain peculiar yellow algae. As to the vertebrates, their previously suspected common ancestry with the starfish is clearly corroborated by a study of the possible origin of one of our most characteristic structures—the nervous system."

Science News Letter, January 4, 1958

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SCIENCE SERVICE

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PHYSICS

New Model for Nucleus

➤ THE INNER part of an atomic nucleus is best represented by a black hole, not a "hard core" as scientists have thought.

This applies at least to the reaction between protons, the positive cores of hydrogen atoms, and anti-protons, tiny bits of matter in every way like protons but with negative charges. When protons and anti-protons smash into each other, both are annihilated and a burst of energy released.

Dr. Geoffrey F. Chew of the University of California's Radiation Laboratory, Berkeley, told the American Physical Society meeting in Stanford, Calif., that this annihilation was "inevitable" once the inner cores of proton and anti-proton touched. However, when the outer fringes of each nucleus only brush each other, scattering instead of annihilation can result.

The small black hole Dr. Chew uses to represent the central region of the nucleus is surrounded sometimes by a repulsive "wall" and sometimes by an attractive "well."

"Both situations occur," he said, "because the nuclear force has a strong spin dependence and may be either attractive or repulsive," depending on whether the spins are in the same or different directions. The scattering can result when there is a repulsive wall around the center's black hole.

Dr. Chew derived his theoretical model of how protons and anti-protons interact to explain the experimentally observed fact that anti-protons seem to be almost twice as large as ordinary protons. Because of this, scientists have thought that a fundamentally different mechanism of interaction was involved when negative matter collided compared to the collision of two protons.

This is not so, Dr. Chew has concluded. The seemingly large size of anti-protons is due to the "substantial effects" of the fringe areas, the walls surrounding the nucleus' center.

In these fringe areas there are nothing but "garden-variety" pi mesons, the subatomic particles believed to hold the nucleus together. The pi mesons form a cloud at the outer edge of the nucleus.

This pi meson cloud, Dr. Chew said, guides the anti-protons inward so that they bang into the nucleus' center and are annihilated. The area in which annihilation can take place should be much closer to 10 millibarns than to the currently accepted 60 millibarns.

A barn is the physicists' measure of the effective area in which reactions occur when the nucleus is bombarded with atomic particles. It was coined because trying to hit an elusive nucleus with protons is even more difficult than trying to hit the proverbial side of a barn. One barn is equal to an area one-hundredth of a million-million-billionth of a square centimeter, and a millibarn is one-thousandth of that area.

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BIOLOGY

Ultraviolet Aids First Life

➤ THE EARTH'S atmosphere was made up of carbon monoxide, nitrogen, and lesser amounts of hydrogen, water and carbon dioxide when life began.

This picture of what it was like when the first living creatures evolved is drawn by Dr. Philip H. Abelson, director of the Carnegie Institution of Washington's Geophysical Laboratory, in the Institution's annual report.

Experiments by Dr. Abelson to shed light on the origin of life has led him to take issue with others who have "postulated that a thick organic soup was formed and that when living creatures were available they quickly depleted this broth."

This "organic soup" theory, Dr. Abelson believes, would have left the earliest living creatures in the frightening and "catastrophic" position of starving to death once they depleted the soup.

By simulating in the laboratory the effects of the sun's rays on the atmosphere as he has postulated it existed when life began, Dr. Abelson believes organic compounds could have been formed as a stop-gap diet for the creatures.

These organic compounds, including amino acids, building blocks of life, would have tided the earth's first creatures over until they could have evolved an alternative food supply, such as photosynthesis.

When they succeeded in developing the photosynthetic process, a drastic change took place in the earth's atmosphere. Oxygen would have been poured into the atmosphere to blank out the ultraviolet light of the sun's rays. These same ultraviolet rays were instrumental in creating the organic material that the living creatures used to get over the first hurdle of life.

Dr. Abelson's picture of the origin of life, drawn from his experiments with ultraviolet light and the early earth atmosphere, contrasts with some earlier ones of the supposed conditions under which life-like systems might have originated on the earth.

Other highlights from the report are:

Under appropriate conditions, the biophysics group has found, rather large particles containing nucleic acids, proteins and lipids can be formed "spontaneously" from disintegrated cellular material. The particles have a definite shape and size, are quite stable, and are found to contain several of the constituents of bacterial protoplasm, and for these reasons have been named "protomorphs."

Work by Atomic Energy Commissioner Dr. Willard Libby on radioactivity may now make possible the introduction, into the high school and college classroom and laboratory, of radioisotopes of real chemical interest, convenient life-time, and low enough specific activity to be completely safe.

Eight kinds of nuclear reactions are used by stars in forming the elements. The eight processes are necessary to account for the known abundances of the 327 isotopes known in the solar system. One path of synthesis is so newly known it is known only as the "x" process, which is thought responsible for building deuterium, lithium, beryllium and boron. The greatest portion of stellar energy production comes from the "burning" of hydrogen to produce helium.

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PHYSICS

Forces of Nucleus Extend Into Surrounding Space

➤ THE FORCES binding atomic nuclei extend into the surrounding space beyond that occupied by nuclear matter.

This result of delving into the structure of the nucleus was reported to the Stanford Conference on Nuclear Sizes and Density Distributions at Stanford University, Calif., by Dr. Lawrence Wilets of the Institute for Advanced Study, Princeton, N. J.

He said the surface thickness of the nucleus, which is the core of an atom, had been determined very accurately by experiments at Stanford in which the tiny bits of matter known as electrons were hurled at nuclei. Dr. Wilets concluded that nuclear forces extend to greater distances than nuclear matter by comparing results of the Stanford experiments with those in which the heavier particles of matter known as protons and neutrons were thrown at nuclei.

The greater extent of nuclear forces resulted from three effects: the finite range of nuclear forces, the saturation of nuclear forces, and the Pauli exclusion principle, which holds that no two electrons can occupy the same position in the outer electron structure of the atom.

One of the methods of determining nuclear sizes involves using the atomic electrons which surround the nucleus as probes, Dr. Robert L. Shacklett of Fresno State College, Fresno, Calif., reported.

Because the nucleus occupies a definite volume of space, its attraction for certain atomic electrons will be very slightly reduced due to the fact that these electrons spend a small amount of time inside the nuclear volume. By comparing the theoretical and measured values of this attraction, physicists can learn about the size of the nucleus.

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RADIO

Saturday, January 11, 1958, 1:30-1:45 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. Facundo Bueso, dean of the College of Natural Sciences, University of Puerto Rico, San Juan, P. R., will discuss "Science in Puerto Rico."

PHYSICAL CHEMISTRY

Sun May Power Satellite

➤ A sun-powered chemical battery that would last as long as the satellite containing it is foreseen using acridine dyes.

Dr. Gerald Oster of the Polytechnic Institute of Brooklyn, N. Y., has been able to set free more than one volt of electrical energy by putting the dyes first in light, then in the dark. Earth satellites such as the sputniks spend part-time in the sun, part in the earth's shadow.

Acridine dyes are multi-ring organic compounds containing nitrogen, and are usually yellow.

Such a sun-powered chemical battery using acridine dyes would also have application as an energy source for remote areas or where conventional methods of generating electricity are very expensive. Solar energy is readily available, but the processes that have so far been worked out for harnessing it are cumbersome, costly and inefficient.

The new battery works, in principle, much like the conventional lead-acid storage battery, in which electrical energy is used to reduce lead ions to metallic lead during the charging phase. During the discharge phase, the metallic lead is converted to lead ions, giving off an electric current.

In Dr. Oster's chemical battery, the acridine dyes are irradiated with sunlight in the presence of a reducing agent such as potassium borohydride. Nearly 25% of the light absorbed by the dye converts into chemical products that, if made one chamber of an electrical cell, would produce electricity.

The action occurring in light is equivalent to the conventional battery's charging phase, and the reaction in the dark is equivalent to the discharge phase. The energy absorbed by the light reaction and set free by the dark reaction is equivalent to 1.2 to 1.4 volts.

Dr. Oster is continuing his studies, made under the auspices of the Air Force Office of Scientific Research, with the aim of making the overall reaction completely reversible.

Once mastered, complete reversal would mean the ability to store the sun's energy, then to release it at will.

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MEDICINE

Charged Air Kills Pain

➤ THE NEED for large doses of pain-killing narcotics for badly burned patients has been eliminated by the use of electrically charged air, Dr. Theodore A. David, Northeastern Hospital, Philadelphia, Pa., reported.

Dr. David, associate in surgery at the hospital, has used the negatively ionized air on about 75 burn cases of all degrees during the last two years.

The air is generated in a portable machine that blows the ionized air out into the patient's room. After two exposures to the air, lasting 20 minutes each, the patient seldom needs any more narcotics, Dr. David told SCIENCE SERVICE.

Negatively ionized air is composed of air molecules that have been given a negative charge. The air gets its charge in an electrostatic generator by being blown over a high voltage wire carrying a large current.

The ionized air is now standard treatment for all the hospital's thermal burn cases, that is, burns caused by excessive heat. Burns caused by chemicals, however, do not respond as well.

A striking example of the success of the treatment is one patient who suffered burns of all degrees over 50% to 60% of his body. Because of the ionized air, he requires no regular doses of narcotics. Even the dressings on the burns can be changed without the painkillers.

The usual case that is burned this badly would need narcotics for two or three weeks, Dr. David said.

How the ionized air goes about killing pain is still a mystery. Studies made with an electroencephalograph to record brain waves indicate the ionized air creates effects similar to those caused by the tranquilizing drugs.

The treatment could be very important in the event of mass casualties since large numbers of burns could be treated at the same time by ionization.

Associated with Dr. David in the studies are Drs. John R. Minehart and Jean Fasano, of the Hospital, and Dr. Igho H. Kornblueh, Graduate Hospital of the University of Pennsylvania, Philadelphia, who has been studying the medical uses of ionized air for the past five years.

The equipment being used was designed and built by the advanced studies group of the Philco Corporation, Philadelphia.

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MEDICINE

New Salk Technique May Aid Cancer Study

➤ A NEW and simple technique for measuring the amount of antibody in blood serum is reported in *Science* (Dec. 27) by Dr. Jonas E. Salk, the scientist famed for his work with polio vaccine, and Elsie N. Ward, University of Pittsburgh, Pa.

The test was used to study antibodies from monkeys which had been inoculated with continuously propagating heart cells. The relationship between these cells and cancer cells is not yet understood.

In response to a flurry of popular interest in the possibility of a vaccine against cancer, Dr. Salk was quoted as saying: "We are not now working on a cancer vaccine. We are doing basic studies on the nature of cells. This has no practical significance now."

To determine the potency of an antibody-containing serum, it has been the customary practice to continue diluting the serum until it loses its cell-killing effect on a constant concentration of metabolizing cells.

In the new technique, instead of diluting the serum, the number of cells on which it is tested is varied. Thus, the more potent the serum is as far as antibody content is concerned, the greater number of cells it will act against.

The serum solutions are prepared so that a changing color will indicate the number of cells affected. In this way, indications of trends are often evident overnight.

When the test was used to study continuously propagating heart cells, it was found that monkeys inoculated with these cells developed a type of antibody which was not destructive to other types of monkey cells but only to the propagating type.

On the other hand, chicks developed an antibody that killed both the propagating cells and other cells.

"It is apparent that considerable further study is required before any conclusions can be drawn," the scientists report.

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GIANT WHIRLER—This huge centrifuge, designed and built by the Rucker Company, Oakland, Calif., will be used to test components of the Atlas intercontinental ballistic missile at the Convair Division of General Dynamics Corporation. The streamlined compartment in the foreground can hold a one-ton load, whirled at 121 revolutions per minute. The ten-ton steel boom is 40-feet long. Extremes of temperature and acceleration can be tested simultaneously.

PUBLIC HEALTH

States Can End Pollution

➤ WATER POLLUTION problems that plague the entire nation can be solved by following the example of mutual cooperation between the eight states of the Ohio River Valley that has nearly ended sewage contamination problems and made a big dent in other types of pollution.

Living conditions for 86 of every 100 persons living along the Ohio River have been, or soon will be, improved by scientific controls that could be adapted to any area where a willingness to cooperate exists.

The Ohio River Valley Water Sanitation Commission points out in its annual report that nine years ago when the eight states pledged cooperation in a compact approved by Congress, less than one of each 100 persons in the area was served by sewage purification facilities.

Final plans for treatment works to serve another 1,100,000 population have been approved.

Having nearly eliminated sewage pollution problems, the Commission is now putting its attack on industrial contamination into high gear.

There are 1,431 industrial plants, some of them the largest of their type in the world, discharging waste into the Ohio River and streams feeding it. However, the report states, some progress already has been made. The number of plants now complying with the Commission's minimum pollution control requirements has jumped from 323 to 719 in the past four years. Several thousand smaller industries have been connected to municipal sewer systems so their wastes are treated before being poured into the river.

Among the plans for insuring better safeguards of water resources are: radioactivity monitoring stations; taste and odor investigations; a survey of coal mine operating procedures; development of control measures along the Monongahela River, which joins the Allegheny River at Pittsburgh to form the Ohio.

Beautification and recreational facilities have been a by-product of industrial water pollution control. Exposed coal in worked-out strip mining pits have been covered and shallow ends of the pits have been dammed. The procedure prevents formation of contaminating acids by coal exposed to the air. The resulting lakes provide fishing and swimming for nearby residents.

Commission members are appointed by governors of Illinois, Indiana, Kentucky, New York. Ohio, Pennsylvania, Virginia and West Virginia. The states banded together voluntarily and are bound only by a pledge of "faithful cooperation."

The report is available from the Ohio River Valley Water Sanitation Commission, 414 Walnut St., Cincinnati 2, Ohio.

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METEOROLOGY

1958 Storms Named

➤ THE WEATHER Bureau has revealed the names to be given any hurricanes appearing during 1958 in the Atlantic or Gulf of Mexico.

The first tropical storm will be named Alma. Succeeding ones will be named, in order, Becky, Cleo, Daisy, Ella, Fifi, Gerda, Helene, Ilsa, Janice, Katy, Lila, Milly, Nola, Orchid, Portia, Queeny, Rena, Sherry, Thora, Udele, Virgy, Wilna, Xrae, Yurith and Zorna.

Finding appropriate names for hurricanes is a problem for Weather Bureau officials and they welcome suggestions from the public. To be eligible for the list, however, the names must be legitimate ones.

In addition, the names must have two syllables, no more than six letters, and be easy to pronounce. Easy pronunciation is essential because of the hundreds of thousands of times the name is used in telling the public of the storm's movements.

The names must be ones not previously used for the Atlantic, since an entirely new list is issued each year. They must also not be among the 84 permanent names, on four lists of 21 each, that are used in rotation for identifying typhoons in the Pacific.

The obviously difficult letters of the alphabet to match with appropriate names are Q, U, X, Y and Z. These are the five omitted from the permanent Pacific lists.

Foreseeing the possibility of running out of names, the Weather Bureau is considering allowing a name to become eligible for the list after three or five years if it has never been used to identify a hurricane.

Names for such famous hurricanes as Audrey, Hazel, Carol, are sure not to be repeated within ten years, perhaps never.

Even after a suitable name is found for each letter of the alphabet, there is the problem of making sure that the "ah" and "ee" sounds do not come together.

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PUBLIC SAFETY

"Fossil Water" Lakes For Radioactive Waste

➤ CURIOUS American lakes possessing a built-in bottom layer of "fossil water" were suggested as suitable places to dump radioactive waste.

The suggestion that these lakes, called meromictic lakes, may be suitable depositories for some types of radioactive wastes was made to an American Association for the Advancement of Science meeting in Indianapolis, Ind., by Dr. Curtis L. Newcombe of the U. S. Naval Radiological Defense Laboratory, San Francisco, Calif.

Meromictic lakes do not have a complete surface to bottom circulation. This results in an isolated, sealed-off bottom layer (the monimolimnion layer) that possesses marked stability and permanence. Because of these properties, the bottom layers of water may be regarded as "fossil waters."

A critical need exists for harmless places in which to dispose of radioactive waste, Dr. Newcombe, who is the Laboratory's principal investigator, said. The problem is becoming more and more acute because of the increased construction of nuclear reactor power stations. By 1980, it is conceivable that the U. S. nuclear power capability would result in fission products having a heat power level equal to about twice the quantity of all the radioactivity in the oceans of the world.

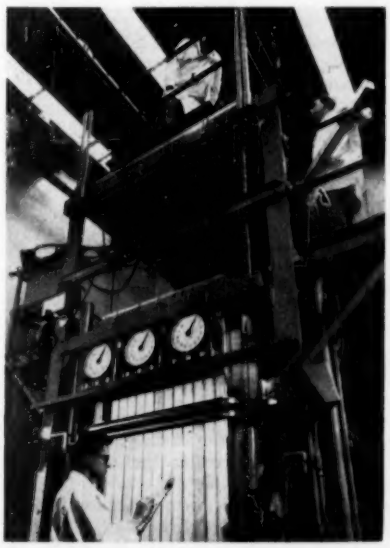
High level liquid wastes (two roentgens per hour or more), Dr. Newcombe explained, present the most serious problem. Presently they are stored in man-made enclosures underground pending some other safe place to get rid of them.

This is where the "fossil water" lakes may contribute significantly to the radioactive waste problem.

More study is needed, Dr. Newcombe emphasized, and one question in particular that needs answering is to what degree the heat from radioactive wastes deposited on these stagnant lake bottoms will change the bottom layer's stability.

Studies conducted by Dr. Newcombe in Sodon Lake in Michigan, a small, meromictic lake where the bottom layer is 18% of the total volume of water, showed it would take approximately a million curies during one year to raise the water temperature 35.6 degrees Fahrenheit, assuming no heat loss.

Science News Letter, January 4, 1958



REACTOR MOCK-UP—The reactor core mock-up, called Plastic Mock-Up Assembly, for the world's first atomic-powered destroyer is readied for tests by General Electric Company scientists at the Knolls Atomic Power Laboratory.

MEDICINE

Injections of Vitamin A Stop Corn Pain

➤ INJECTIONS of vitamin A under painful corns have been able to stop the pain after all other forms of conventional treatment have failed, Dr. Bernard Drummer, a Bronx, N. Y., podiatrist, told SCIENCE SERVICE.

In a trial series of 21 patients with painful corns, the vitamin A preparation was injected around the corn and eliminated all symptoms of the condition. Before the injections, many of the foot sufferers had needed regular attention at short intervals in spite of silver nitrate applications, anesthetic injections of procaine and the like.

Corns are caused by an irritation that stimulates the growth of the skin in the outer, or horny layer. The vitamin A injections cut down this growth and cause the corn to shrink in size and sometimes disappear altogether. Even if the corn is not completely eliminated, the pain stops almost immediately, Dr. Drummer said.

The actual skin lesion can often be eliminated by proper balancing of the foot but many times the pain is still there after balancing. The fastest and best results have come from the use of proper foot balancing along with the vitamin injections.

The vitamin A preparation, trade named Keramin, is produced by the Campbell Pharmaceutical Co., New York, which studied the vitamin's effect on skin growth in animals.

Dr. Howard A. Jewell, of the company, and associates found that in rabbit skin the vitamin injections slowed down the death of the skin cells which normally progress outward to the surface and then die and become horny. The vitamin permitted cells to accumulate in the tissue and the skin actually increased four or five times in thickness.

Dr. Jewell's findings are published in the *Proceedings of the Society of Experimental Biology and Medicine* (Oct.).

The clinical studies of the Keramin injections, done by Dr. Drummer, will be published in a forthcoming issue of the *Journal of the National Association of Chiropodists.*

Science News Letter, January 4, 1958

PUBLIC HEALTH

Smog Irritation Is Relieved by Ammonia

➤ THE ILL EFFECTS of two injurious gases possibly found in smog can be eliminated by adding either ammonia or magnesium oxide smoke to the atmosphere, Dr. Van M. Sim, Army Chemical Center, Edgewood, Md., and Richard E. Pattle, Porton, England, report in the *Journal of the American Medical Association* (Dec. 14).

Healthy volunteers were exposed to a number of possible smog irritants including sulfur dioxide gas and sulfuric acid mist. They breathed the irritants through an oxygen-type mask or from the atmosphere inside a sealed chamber.

The sulfur dioxide gas caused watering eyes, runny noses and a high-pitched musical rale in the chest, while the sulfuric acid mist created these conditions as well as long-lasting symptoms of bronchitis.

The effects of the sulfuric acid mist were counteracted by adding ammonia to the atmosphere. When it was used in the chamber along with the acid mist, it caused almost immediate relief from the smog symptoms.

The sulfur dioxide gas could also be counteracted in the same way by using either ammonia or by burning magnesium ribbon in the chamber. This destroyed the irritating properties in the atmosphere.

Experiments with sulfuric acid mist should be approached with caution, the scientists report.

The concentration of a mist of this acid in fog is sometimes as much as three times as great as that of sulfur dioxide. It may have been one of the important toxic agents of London's "killer" fog of 1952.

During this fog, the death rate from respiratory diseases was over five times the normal rate.

Science News Letter, January 4, 1958

MEDICINE

Drug Stops Worm Infections

➤ A SINGLE drug that can stop five different types of human worm infections, including whipworms, roundworms and pinworms, is reported by a group of southern scientists in the *Journal of the American Medical Association* (Dec. 21).

The drug's name is dithiazanine and is called a "broad spectrum anthelmintic" since it acts against various intestinal parasites similarly to the way broad spectrum antibiotics, like penicillin, work against several types of bacteria.

Worm parasites affect millions of people throughout the world. There are an estimated 355,000,000 cases of whipworm, 679,000,000 from two types of roundworm, 208,000,000 of pinworm, and 456,000,000 of hookworm, the scientists report.

The new drug is especially valuable against whipworm infections and those caused by the roundworm, *Strongyloides stercoralis.* There has been no practical and effective treatment against them up to now.

Dithiazanine is a blue powder that will not dissolve in water. It is placed in delayed-release capsules that do not open until they have passed through the stomach. Depending on what types of worms are involved, the drug takes between three and twenty-one days to act. It is effective in cases of mixed infection and can be used for whipworms without hospitalizing the patient.

Reporting on the drug were Drs. J. Clyde Swartzwelder, William W. Frye, John P. Muhleisen, Joseph H. Miller, Robert W. Sappenfield and Mr. Stanley H. Abadie, New Orleans, La.; Dr. Ralph Lampert and Samuel O. Anthony, Alexandria, La.; and Dr. Antonio Pena Chavarria, San Jose, Costa Rica.

Science News Letter, January 4, 1958

IN SCIENC

PSYCHOLOGY

Wearing Helmet in Bed Aids Sleep Study

➤ A METHOD for determining how deeply a person sleeps, that is more sensitive than recording his body movements, is reported by Dr. Ogden R. Lindsley, Behavior Research Laboratory of Harvard Medical School at Waltham, Mass., in *Science* (Dec. 20).

The subject goes to sleep in a comfortable bed wearing an aviator's helmet. Inside the helmet is an earphone through which comes a pure tone.

By a motion of his thumb, the sleeper can turn the sound off by activating a microswitch that has been taped to his hand. If he keeps working the switch fast enough, he can completely eliminate the sound. If he works it slowly, he reduces the sound to moderate intensity and if he fails to operate it at all, the sound reaches its full intensity of 30 decibels.

A record of the number of responses the sleeper makes shows how deeply he is sleeping throughout the night. Similar records made of his body movements were found to be much less sensitive.

The new method should enable scientists to study sleep more effectively and investigate the effects of drugs, brain surgery and sleep deprivation as well as the types of stimulation that cause awakening.

Science News Letter, January 4, 1958

PHYSIOLOGY

Research Throws Light On Tranquilizers' Action

➤ SCIENTISTS at the University of California at Los Angeles have provided new information on how tranquilizing drugs act on the brain.

The research, carried out by Drs. Thomas Haley of the Atomic Energy Project and S. R. Dasgupta of the UCLA Medical School, is described in a recent project report.

In animal studies it was found that reserpine by itself acted directly on certain brain areas to bring about its tranquilizing effects. These effects are apparently brought about by an action of the drug on regulating mechanisms in the brain stem.

One of the mechanisms affected by the drug is a center called the RAS (reticular activating system) which is known to regulate how "awake" we are.

It had previously been thought that reserpine stimulated the flow of serotonin, a substance thought to be a neuro-hormone, which in turn acted on the brain.

But apparently the action of reserpine itself on the brain brings about the tranquilizing effects. Also, only a very small amount of the drug is needed.

Science News Letter, January 4, 1958

ICE FIELDS

AGRICULTURE

Find Way for Growing Hybrid Cotton Plants

➤ THE POSSIBILITY of growing cotton, a discovery which may rival the development of hybrid corn in its impact on world agriculture, has been reported.

Experiments at the University of California College of Agriculture, Riverside, resulted in the creation of male-sterile strains of cotton, indispensable for obtaining hybrid plants.

The majority of cotton plants now being grown commercially are self-pollinated, pure-bred strains. They lack what scientists call "hybrid vigor."

It is this hybrid vigor that leads to higher yields and greater disease resistance. On the basis of hybrid corn data, it is possible that cotton yields could be increased 10% through hybridization.

By inducing male sterility in one cotton strain with a chemical spray applied about a week before flowering, the California scientists obtained hybrid cotton seeds with the characteristics of two separate strains. Four cottons, two American-Egyptian and two upland varieties, were tested under field conditions and each produced hybrid seed.

Achieving a good method for producing hybrid cottonseed, reports Dr. Frank M. Eaton of the College's department of soils and plant nutrition, will generate intense world-wide interest in evaluating the combining abilities of world cottons.

Called "selective gametocide," the method as reported in *Science* (Dec. 6) involves using salts of chlorinated organic acids to produce sterility. It is foreseen that this same hybridization method may prove useful for cross breeding other crops and improving strains of economically useful ones.

Preliminary tests were initiated at the Texas Agricultural Experiment Station, College Station.

Science News Letter, January 4, 1958

BIOLOGY

Germ Dye Found To Help Against Cancer

➤ METHYLENE BLUE, a widely used dye for staining bacteria to make them show up well under the microscope, can cure fast-growing cancers in small animals, R. T. Pursell, a veterinarian from New South Wales, reports in *Nature* (Dec. 7).

The dye has been used since 1941 to treat cancers in dogs brought to his small-animal clinic and was most successful against rapidly growing cancers in which most of the main growth had been removed surgically. It was not any help against slowly growing types of tumors, nor against those which had severely affected internal organs.

"A number of cases are in good health and have survived without apparent recurrence of the tumor for up to five years, although at the time of treatment the growth was doubling itself in size every two weeks," the scientist reports.

When the dye does work, it apparently causes any remaining cancerous tissues to die and slough off, leaving a wound that heals completely.

There seems to be no doubt that intravenous injections of the dye can be a most valuable additional treatment during surgery for some cancers. The dye possibly interferes with a metabolic system in the cancerous cell which is more sensitive than that of a normal one, the veterinarian suggests.

While it may not be the most effective agent for doing this, the dye's action may help identify another "weak link" in the make-up of the tumor cell, he concludes.

Science News Letter, January 4, 1958

PHYSIOLOGY

Rat "Alcoholics" Debunk Theory About Heredity

➤ EVIDENCE AGAINST the theory alcoholics may drink because of an hereditary defect in their metabolism is provided by a cafeteria-feeding experiment with rats.

The rats were offered a complete diet which included a fountain full of alcohol. At first it appeared that some of them showed a marked preference for the beverage, Drs. R. J. G. Gillespie and C. C. Lucas, University of Toronto, report in *Nature* (Dec. 7).

The explanation seemed to be that the "drinkers" actually had an inborn body defect that made them want the alcohol, but suddenly most of the "alcoholic" rats became "teetotalers." Some of the "teetotalers" started to drink a considerable amount of alcohol.

The results surprised the scientists so much they decided they had made a mistake in their record-keeping. Repeated checks showed, however, that they had not done so.

"The mystery was solved when it was noticed that the relative positions of the food-dish, water-fountain and alcohol-fountain controlled, to an astonishing degree, the drinking pattern of some of the rats," they report.

In 20 out of 25 of the rats the position of the fountain affected their "preference." Two actually did appear to prefer the alcohol while nine others preferred the water. None of the rats ever appeared "stuporous," however.

One explanation for the fountain-position effect may be that the rats have right- or left-pawed preference, since most of them use one paw to hold up the fountain lids while they drink. Also, many rats like a drinking fountain that is in an uncrowded location.

The results provide a warning to other scientists studying rats and drinking that the type of cage and placement of food dispensers have much to do with their "preferences," the scientists conclude.

Science News Letter, January 4, 1958

PHYSIOLOGY

Wearing a Kilt Would Lessen Gene Mutations

➤ MEN MAY have to wear kilts if they want to reduce the number of defective genes they are producing, a group of scientists from Stockholm, Sweden, suggest in *Nature* (Dec. 21).

The trouble with the type of clothes worn by Europeans and Americans for the last several centuries is that they increase body heat around the male sperm cells. This heat speeds up the rate of mutation in the genes and the mutant genes could then cause defective children.

Tight clothing might explain almost half of the present spontaneous mutation rate, they said, basing their estimates on similar temperature effects in fruit flies.

In mammals, nature has placed the sperm producing cells outside the abdominal cavity because the temperature inside is three to nine degrees Fahrenheit too hot for them. Clothing, the researchers find, increases the temperature around the cells about five and a half degrees Fahrenheit, what it might be if they were still inside the abdomen.

"We thus see how modes of dress chiefly based on sexual taboos might imply genetical hazards 100 to 1,000 times greater than those estimated from different sources of radiation," the scientists report.

If the eugenists decide this increase is dangerous, then some changes will have to be made in the design of men's clothing.

The scientists suggest something similar to the Scottish kilt or else a pair of trousers fitted with a codpiece, a flap on the front of the trousers, as used in medieval Europe.

Reporting the research were Lars Ehrenberg and Gunter von Ehrenstein, University of Stockholm, and Arne Hedgran, Institute of Radiophysics, Stockholm.

Science News Letter, January 4, 1958

BIOLOGY

Leukemia in Mice Caused By Purified Nucleic Acid

➤ INJECTIONS of free nucleic acid have been found to create leukemia in mice, Drs. Esther F. Hayes, Norman S. Simmons and William S. Beck, University of California, Los Angeles, report in *Nature* (Dec. 21).

The purified nucleic acid was prepared from lymphatic tissues taken from a strain of mice known to have a high rate of leukemia. Part of the nucleic acid was taken from non-leukemic tissue and the other part was taken from leukemic tissue.

Both types of acid were able to produce an increased amount of leukemia when injected into newborn mice.

These preliminary results in hybrid mice suggest that free nucleic acid causes leukemia, although they do not rule out the possibility that a virus might be the active agent in the acid, the scientists report.

It is unlikely, however, that intact active virus could survive the chemical procedures used to isolate the nucleic acid.

Science News Letter, January 4, 1958

GENERAL SCIENCE

Science Forecast for 1958

A rocket may reach the moon this year and there will be more satellites, with two possibly joined together as first step toward a space platform.

By WATSON DAVIS

➤ A ROCKET may reach the moon in 1958, not a man-carrying space vehicle but a more modest missile. This may be aimed to circle the earth's natural satellite. Or it may splash a gentle sign of man's prowess on the moon's surface, perhaps a marking dye. Or it may explode a hydrogen bomb on the moon, where it will do less harm than on earth, even if it contaminates that heavenly body.

A rocket to the moon is no 1958 certainty, but it is not too much harder to get to the moon than it is to launch a big satellite.

There will certainly be more ventures by man's rocket creations into outer space. Additional satellites will be launched by both Soviet Russia and the United States. There may be beginning attempts to join two satellites together, the first step toward a space platform.

One of the earth-circling satellites may carry a television device that will spy upon all portions of the globe's surface successively as it orbits, which would be useful for knowing and forecasting the weather but also in a dangerous way useful for military purposes.

Facts by "Beeps"

More important for future knowledge will be facts that satellites, both American and Soviet, will return to earth by their "beeps" as to what exists in outer space just above the earth's atmosphere. Scientists are curious as to what exists 180 to 600 miles above the earth, what atoms and ions are there and how densely placed they are. This information is important for understanding many natural phenomena and for future space explorations.

Defense-wise, there will be more rockets and missiles readied, tested and put into production in a rush to catch up with the Soviet progress, if that nation actually is ahead of the United States in that field. Due to secrecy, we are much more likely to know when things go wrong and there are failures than when there are successes and significant progress.

There will be very high balloon flights taking apparatus for many hours above 99.7% of the atmosphere. This will settle the open question as to whether there exists in the cosmic radiation the hearts of light elements, lithium, beryllium, and boron. This will give clues on the origin of the cosmic rays, for such light nuclei may be evidence for gigantic thermonuclear reactions in the universe.

Construction will continue on four new high energy accelerators for exploring with immense energies the constitution of matter.

Princeton and Pennsylvania Universities are building a three billion electron volt proton synchrotron, Harvard and M.I.T. a six billion electron synchrotron, Brookhaven National Laboratory a 30 billion proton synchrotron and CERN at Geneva also a 30 billion proton synchrotron. The last three use strong focusing magnets and therefore form a new class of accelerators. All of these powerful "atom smashers" are planned for completion in early 1960 and assure major new discoveries in the atomic field.

Reporting Cosmic Dramas

In the gigantic cosmic "machines" that are in the galaxies and aggregations of stars, there may be discovered that new differences exist in such familiar objects as variable stars and clusters. Although at times both the satellites which are so relatively close to us and happenings on the surface of the earth monopolize our attention, there are cosmic dramas being performed in the vast spaces of the universe that our telescopes, receiving both light and radio waves, will watch and report.

Radio astronomers are hopeful that 1958 will witness the practical use of the maser in radio astronomical problems. The maser, named from "microwave amplification by stimulated emission of radiation," is a device that causes solids to oscillate at microwave frequencies and makes possible higher amplifications. Applied to radio telescopes it is expected the utility of these relatively new viewers of the universe will be increased a hundredfold.

Control of the nation's constantly increasing air traffic will receive the benefit during the coming year of elaborate devices that work more rapidly than human abilities. Computers, memory drums, data processing apparatus are now required to speed up air traffic control because of the increased number of passenger flights and the appearance of jet planes. The human mind and voice are no longer fast enough. The result of progress by the Civil Aeronautics Administration will be safer air transport.

The big research push against cancer may begin to pay off in saving doomed lives. A chemotherapeutic agent against cancer is the most dramatic possibility in medicine today. It will take months and years of clinical testing and evaluation, even if the hoped-for discovery is made. There are two methods of attacking the problem of cancer from a research standpoint. One is a widespread search and testing of all possible drugs, thousands of them, on the shelves of the pharmaceutical houses or synthesized for the purpose. The other is extensive basic research into the fundamental nature of malignancy. More money is being spent at the moment on the drug testing, but it may be that the fundamental research, slow as it seems, will pay off first.

The fight against virus diseases will continue, with the common cold, a multiple disease or bundle of diseases, as a target for progress in 1958. Some of the other diseases that plague us consistently may give signs

MOON IN DETAIL—The waning moon rising over Mt. Elden in Arizona, photographed by Arthur A. Hoag with the relocated U. S. Naval Observatory 40-inch telescope at Flagstaff, shows features of the lunar surface in clear detail. The tree line is nine miles from the telescope.

of being brought under greater control, as polio has been by its vaccine.

There is the possibility of a new epidemic of an old disease appearing somewhere and threatening to sweep the world, as Asian influenza did in 1957. Medical scientists will keep alert to this and we can be confident that defenses will be built against any natural disease menace, just as during the war and since there have been major advances toward being ready to counter any attempts at disease or bacteriological warfare.

Euphoriants Needed

A great need in the modification of human personality now is recognized as a way of elevating the mood of an individual by means of a drug. Tranquilizers have been achieved and are in wide use, both in the general population and in mental hospitals. Now euphoriant drugs are needed. These will have usefulness in treating depressions, both those that reach the seriousness of needing psychiatric attention and possibly even the day-by-day "down in the dumps" feeling.

The youths of America who want to become the scientists, technologists and engineers so urgently needed for the future may get a "break" in 1958. Due to the sputniks and fear of Soviet scientific and educational progress, there may be more resources for bolstering scientific interests on the part of students, particularly in our secondary schools. There may be extensive support voted by Congress and scholarship programs of considerable size.

The effective method of helping boys and girls in their 'teens do their own science projects and experiments, as inspiring preludes to science careers, will get reinforcement, nationally and at local levels. More than 300,000 youths will do science projects and exhibits and show them in thousands of science fairs in schools and in over 150 regional fairs, which will culminate in the National Science Fair in May at Flint, Mich.

Boys and girls will ask more questions than ever. They will have fun and learn by doing, aided by the experts and the teachers in their community. A continuing renewal of the scientific and engineering manpower of the nation will result.

Postmortem on 1957

The science forecast for 1957 made by Watson Davis, director of SCIENCE SERVICE, and issued a year ago was fulfilled in many respects.

It was "the year of the missiles" as predicted and "the first of the earth satellites to be launched by man's inventiveness" did "sail upward on a three-stage rocket," although it was not a U. S. but a Soviet achievement.

The International Geophysical Year began to produce results, as foreseen.

There was progress in the building and operation of large "atom smashing" accelerators and the Soviets did take the world's lead with a ten billion electron volt machine, run at 8.3 Bev, although still bigger accelerators began building in the United States, as also forecast.

The Atomic Energy Commission did reduce, as expected, the biological safe dose or tolerance level for radiation.

The search for a chemotherapeutic agent active against cancer continued on an enhanced scale, but, as also expected, there was not a "breakthrough."

There was, as anticipated, an important discovery of fossil man, the Neanderthal skeletons in Iraq.

The national science youth program accelerated even more than foreseen, due to the situation following the sputnik satellite launchings.

Science News Letter, January 4, 1958

TECHNOLOGY

A-Power Plant Operates At Full Power

➤ THE WORLD'S first full-scale nuclear power plant designed and operated exclusively for civilian use began operating at full power on Dec. 23, 1957.

The Shippingport Atomic Power Plant delivered, on a test basis, 60,000 kilowatts of electricity net to the Duquesne Light Company's system in the Pittsburgh, Pa., area.

Science News Letter, January 4, 1958

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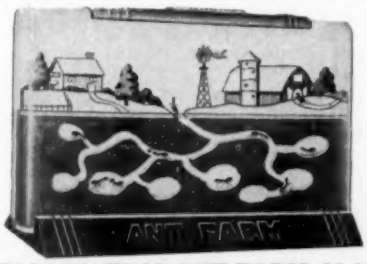

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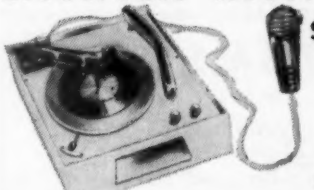

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADVANCES IN VETERINARY SCIENCE: Volume III—C. A. Brandy and E. L. Jungherr, Eds.—*Academic*, 579 p., illus., $13. Summarizing and reviewing progress.

APPLIED HYDRO- AND AEROMECHANICS—based on lectures by L. Prandtl by O. G. Tietjens, translated by J. P. Den Hartog—*Dover*, 311 p., illus., paper, $1.85. Student edition of a classic.

AUTONOMIC IMBALANCE AND THE HYPOTHALAMUS: Implications for Physiology, Medicine, Psychology, and Neuropsychiatry—Ernst Gellhorn—*Univ. of Minn. Press*, 300 p., illus., $8.50. Reporting experimental work of the author.

CONTRIBUTIONS TO THE PALAEOGRAPHY OF LATIN INSCRIPTIONS—Joyce S. and Arthur E. Gordon—*Univ. of Calif. Press*, 177 p., illus., paper, $4.50.

EELS: A Biological Study—Leon Bertin—*Philosophical Lib.*, rev. from the 2d French ed., 192 p., illus., $7.50. Furnishing both layman and scientist with information and correction of fallacies about this interesting creature. The author died while the book was in press.

THE ELECTROPHYSIOLOGY OF THE HEART—Hans H. Hecht and others—*New York Academy of Sciences*, Annals, Volume 65, Art. 6, 491 p., illus., paper, $4.50.

FINDING FOSSIL MAN—Robin Place—*Philosophical Lib.*, 126 p., illus., $7.50. How scientists have traced man's family tree as told to high-school students and laymen.

FUNDAMENTALS OF CHROMATOGRAPHY—Harold Gomes Cassidy—*Interscience*, 447 p., illus., $9.75. One of a series devoted to presentation of techniques used in the organic laboratory.

THE GENUCILIA GROUP: A Class of Etruscan Red-Figured Plates—Mario A. Del Chiaro—*Univ. of Calif. Press.*, 129 p., illus., paper, $3. These plates date from the beginning of the fourth century through the first half of the third century B.C.

GEOMAGNETISM AND THE EMISSION-LINE CORONA, 1950-1953—Barbara Bell and Harold Glazer—*Govt. Printing Office*, Smithsonian, 57 p., graphs, paper, 65¢.

GEOMETRICAL DRAWING—G. Pearson—*Oxford Univ. Press*, 128 p., illus., $2. Introducing mechanical, architectural and construction drawing.

HISTORY OF HYDRAULICS—Hunter Rouse and Simon Ince—*Iowa Institute of Hydraulic Research*, 269 p., illus., $5. Tracing the history of the science since long before Archimedes jumped out of his bath after making his momentous discovery.

INTRODUCTION TO BIOSTATISTICS—Huldah Bancroft—*Hoeber-Harper*, 210 p., $5.75. Especially for sophomore medical students.

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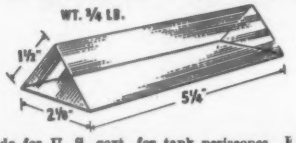

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PUBLIC HEALTH

Alcoholism Prevention Possible in a Few Years

ALCOHOLISM, believed this country's fourth most important disease, can be effectively prevented "within a very few years," Dr. Roger J. Williams, director of the Biochemical Institute, Austin, Tex., has reported.

Both detection and treatment of alcoholism-prone individuals, before they become alcoholics, appear possible in the near future, Dr. Williams told the American Association for the Advancement of Science meeting in Indianapolis, Ind. In doing so, he agreed with many scientists who believe alcoholism probably has a psychological basis, not one of nutritional deficiency.

Dr. Williams said that anatomy, physiology, biochemistry and psychology all contribute to the disease.

Other highlights of the AAAS meeting:

There is no significant difference between death rates in cities where the water is fluoridated to give protection from tooth cavities and cities where it is not, Dr. Thomas L. Hagan, dental officer with the U. S. Public Health Service in Washington told the Association. He said his studies confirmed previous research showing there is no basis for charges that water fluoridation has caused an increase or decrease in mortality.

Dr. Hagan said his studies also provided another link in the chain of evidence supporting the safety of water fluoridation. He compared the "recorded" and "expected" death rates for five cities before and after controlled fluoridation was started, eliminating mathematically such variables as age, race, sex and declining mortality.

Nearly two-thirds of all the new inmates entering American prisons each year have been in prison before. Within the prison, four-fifths of those sent to solitary confinement have been in solitary confinement before.

These figures show that the problem of getting lawbreakers to conform to accepted behavior patterns remains unsolved, Dr. Vernon Fox, professor of criminology and corrections, Florida State University, told the meeting. He said it remains unsolved because there is a basic conflict between the needs of social authority and of the nonconforming person.

Science News Letter, January 4, 1958

Do You Know?

Nearly seven percent, 142,000 persons, of a total of 2,000,000 *Federal employees* in 1953-54, were engaged in research and development.

World *agricultural* production increased by about three percent in the past year, slightly above the rate of population growth.

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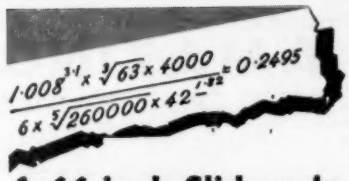

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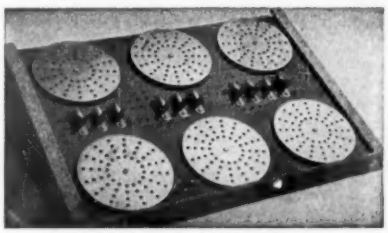

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Questions

BIOLOGY—With what plant form does man share a common ancestry, according to one scientist's theory? p. 4.

MEDICINE—What serves as the two electrodes in the "capacitance heart sound pickup"? p. 3.

PHYSICAL CHEMISTRY—What chemical compounds were used in experiments that may lead to a sun-powered chemical battery? p. 6.

Photographs: Cover, University of Illinois; p. 3, General Motors Corporation; p. 6, General Dynamics Corporation, Convair Division; p. 7, General Electric Company; p. 10, U. S. Navy; p. 16, Bakelite Company.

ENGINEERING

Radio Direction Finder Will Study Ionosphere

See Front Cover

➤ PROBLEMS in radio direction finding, including deflection of signals by the ionosphere, will be studied with a very large radio direction finder now being built at the University of Illinois.

The photograph on the cover of this week's SCIENCE NEWS LETTER shows the circle of 120 poles, each 65 feet high, the first step in the direction finder's construction.

The poles will support a radio-reflecting screen 955 feet in diameter; buried wires of a ground mat extend the diameter to 1,300 feet.

Radio direction finders can be used to study the ionosphere, a radio-reflecting layer in the upper atmosphere that often causes signals to deviate from the most direct line.

Edgar C. Hayden directs the project, sponsored by the Navy Bureau of Ships. The finder was designed jointly by engineers at the University and at the Federal Telecommunications Laboratory.

Science News Letter, January 4, 1958

MINING

Uranium Refining Process Perfected

➤ A STANDARD process for extracting uranium from its ores has been perfected to the point of 99.99% recovery of the vital metal.

Perfection of the liquid-liquid extraction process was reported to the American Institute of Chemical Engineers meeting in Chicago by D. S. Arnold, B. G. Ryle and J. O. Davis, scientists of the National Lead Co., Cincinnati.

In separating the uranium from clay, rocks and metals that make up the ore, the aggregate is first dissolved in acids. In the perfected system an organic solvent, tributyl phosphate-kerosine, is next added to extract the uranium. The scientists believe the process may also be adapted to extract other materials.

Science News Letter, January 4, 1958

BARGAIN PARADISES OF THE WORLD

Do you know where to find an island right near the U. S. so nearly like Tahiti in appearance, beauty, and color even the natives say it was made from a rainbow? (And that costs here are so low you can not only reach it but also stay a while for hardly more than you'd spend at a resort in the U. S.?)

Do you know where to find the world's best mountain hideaways or its most dazzling surf-washed coastal resorts, where even today you can live for a song?

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Or if you've thought of more distant places, do you know which of the South Sea Islands are as unspoiled today as in Conrad's day? Or which is the one spot world travelers call the most beautiful place on earth, where two can live in sheer luxury, with a retinue of servants for only $175 a month?

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Yes, if you're planning to retire, this book shows that you can live for months on end in the world's wonderlands for hardly more than you'd spend for a few months at home. Or if you've dreamed of taking time out for a real rest, this book shows how you can afford it.

In any case, when it can cost as little as $24.50 from the U. S. border to reach some of the world's paradises, it's time you learned how much you can do on the money you've got. Send now for **Bargain Paradises of the World.** Price $1.50. Use coupon to order.

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Fabulous places like that undiscovered region where winters are as warm and sunny as Miami Beach's yet costs can be two-thirds less. Or that island that looks like Hawaii yet is 2000 miles nearer (no expensive sea or air trip to get there). Or those many other low-cost, exquisitely beautiful spots all over the United States and Canada which visitors in-a-hurry overlook (so costs are low and stay low).

Every page of **Off-the-Beaten Path** opens a different kind of vacationing or retirement paradise which you can afford—places as glamorous as far-off countries yet every one of them located right near at hand. Like these:

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- Resort villages where visitors come by the score, so you always meet new people . . . (but they never come by the thousands to raise prices or crowd you out).
- That remarkable town where a fee of 3¢ a day gives you an almost endless round of barbecues, musicals, concerts, picnics, pot luck suppers, smorgasbord dinners and a fine arts program. That southern island first discovered by millionaires who had all the world to roam in . . . and now their hideaways are open to anyone who knows where to find them.

You read of island paradises aplenty in the United States and Canada, of art colonies (artists search for picturesque locations where costs are low!), of areas with almost a perfect climate or with flowers on every side. Here are the real U. S. A.-brand Shangri-Las made for the man or woman who's had enough of crowds. Here, too, are unspoiled seashore villages, tropics-like islands, and dozens of other spots just about perfect for your retirement or vacation at some of the lowest prices you're heard of since the gone-forever prewar days. They're all in the United States and Canada, and for good measure you also read about the low-cost paradises in Hawaii, the Virgin Islands and Puerto Rico.

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The booklet first of all answers the question: What is a freighter? The modern freighter, says the booklet, ranks with the de-luxe passenger vessels so far as comfort and accommodations are concerned.

LARGE ROOMS WITH BEDS

It is important to realize that in most cases today, freighter passengers are considered first-class passengers, although the rates charged are generally on a par with either cabin or tourist-class fare. Most passenger-carrying freighters, to quote the booklet, have their private bath and shower, and these cabins offer beds, not bunks. The rooms are generally larger than equivalent accommodations aboard passenger ships, and the cabin of a modern freighter is sometimes even twice as large as first-class cabins on some of the older passenger ships. It goes without saying that your room is on the outside, and amidships, the most expensive of all locations, for which you are usually charged a premium over the advertised minimum fares on passenger ships.

This booklet points out that it is frequently astonishing how low freighter fares are as compared with passenger ship fares; for example, less than one-half of the passenger ship fare to California is the amount asked on freighters. On most of the longer runs, the difference in favor of the freighters is regularly from a third to half of the passenger ship fare.

SERVICE AND MEALS RATED EXCELLENT

Service and meals on a freighter leave little to be desired. You will be treated with consideration. Stewards will go out of their way to make your voyage pleasant. On ships with East Indian stewards you will be waited on almost hand and foot, in a manner that is completely unknown to Americans and most Europeans.

Foreign ships offer their own specialties, says the booklet. Thus vessels in the East Indian trade serve Rijkstafel, the East Indian dish which can run to as many as 50 different courses. Scandinavian ships serve Smorgasbord every day, and some of their desserts (like strawberries smothered in a huge bowl of whipped cream) are never forgotten. Another feature of freighter travel is in its informality. No formal clothes are needed. Sports clothes are enough.

Other valuable information such as how to tip, shipboard activities and costs are covered in the booklet, "Travel Routes Around the World." Some of the trips listed include a trip to England for $160, a 12-day Caribbean cruise, or a leisurely four-month round the world voyage.

The booklet is published by Harian Publications, Greenlawn, New York, and may be obtained by sending to the publisher. So, when it arrives all you need to do is sit down and take your choice. The booklet lists literally hundreds of ocean trips.

"Travel Routes Around the World" is yours for just $1, and the big new edition includes practically every passenger carrying service starting from or going to New York, Canada, New Orleans, the Pacific Coast, Mexico, South America, England, France, the Mediterranean, Africa, the Indies, Australia, the South Seas, Japan, Hawaii, etc. There's a whole section called How to See the World at Low Cost, plus pages and pages of maps.

A big $1 worth, especially as it can open the way to more travel than you ever thought possible. For your copy, simply fill out coupon.

Mail to HARIAN PUBLICATIONS, 150 Prince St.
GREENLAWN (Long Island), N. Y.

I have enclosed $_____ (cash, check or money order). Please send me the books I checked below. YOU WILL REFUND MY MONEY IF I AM NOT SATISFIED.

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☐ How To Get A Job That Takes You Traveling. $1.00

☐ Travel Routes Around the World—*the traveler's directory of passenger carrying freighters.* $1.00

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• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE SERVICE, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 916. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

SHOWER DOOR KIT for the do-it-yourself enthusiast is available ready to install. Included with two shatter-proof heavy plastic shower doors are a top and bottom rail, two side rails, cement and screws. The doors can be easily removed to get at the tub.

Science News Letter, January 4, 1958

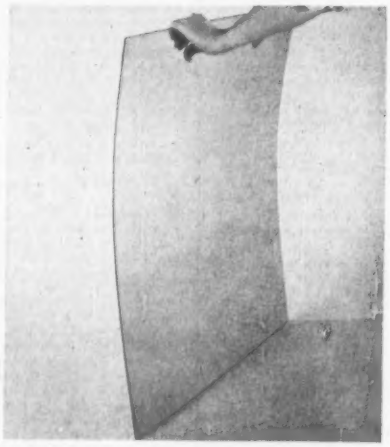
MAGNETIC TAPE INDEX TABS permit the tape fan, amateur or professional, to log his tapes. A tab is pressed to the desired spot for future identification. Subject and time are then posted on a pressure sensitive label of corresponding color and number, which can be placed directly on the reel of tape. The tab is removable.

Science News Letter, January 4, 1958

MICROFILM MACHINE is a fully automatic viewer-enlarger-processor that produces 18-inch by 24-inch working prints from unitized microfilm. One button push delivers stabilized prints in one minute. The finished print can be on standard weight or translucent paper. Magnification is 20X for viewing and 15X for enlarging.

Science News Letter, January 4, 1958

INDUSTRIAL WINDOWS bend, but do not break or crack, when struck. If jarred loose from their frames, they can be



reset with an adhesive. The safety glazing material is a laminate of a rigid plastic vinyl sheet. Available in the form of clear or mottled translucent panels, the material, shown in the photograph, is semi-flexible, light in weight and easy to install.

Science News Letter, January 4, 1958

ERLENMEYER FLASKS with screw caps are available in four sizes: 125,250,500 and 1,000 milliliters. The flasks are fitted with a black plastic screw-cap containing a sealed-in rubber composition liner. The flasks themselves are made from chemical and heat-resistant, low expansion glass.

Science News Letter, January 4, 1958

PAINT SPRAY GUN can be attached to a standard household tank or canister-type vacuum cleaner. The gun is equipped with two nozzles, one for medium and the other for heavy materials. An air hood adjustment controls rate and flow of spray. The gun's glass container holds one quart.

Science News Letter, January 4, 1958

TRANSISTOR RADIO KIT makes up into a radio only slightly larger than a cigarette package. Operating on a penlight battery, the radio requires headphones and an external antenna. The kit comes with plastic case, all parts, transistor, wire, solder, battery and instructions.

Science News Letter, January 4, 1958

GOLF CANE holds 14 clubs and six balls. Designed to replace the golf bag, the aluminum cane can be carried on the arm and will not drag on the ground. Weighing one-eighth that of the conventional bag, the aluminum carrier has a pointed end for holding it upright in the ground.

Science News Letter, January 4, 1958

Nature Ramblings

By HORACE LOFTIN

➤ EVERY YEAR about this time, jokesters ask their birdwatching friends this question: "Aren't there more birdwatchers than birds in the woods when you fellows make your Christmas bird census?

Well, last Christmas season, there were 6,543 bird enthusiasts out braving the cold during the 57th annual "Christmas count" or midwinter bird census. But these hardy 6,543 observed and identified 18,815,680 individual birds in 535 areas over the United States and Canada. This is considerably better than one bird per birdwatcher!

Here is an interesting point, though: while 485 different species of birds were identified in the census, just four of these species accounted for about 14,000,000 of the more than 18,000,000 individuals seen!

Evidently the most abundant winter bird in the United States is the redwing black-

Counting Beaks and Bills

bird. The Christmas census takers counted 8,368,490 of these birds last year, and they occurred in more than half of all the areas where censuses were taken.

Second in numbers was the handsome purple grackle, with 2,526,490 individuals seen. This bird occurred in 168 of the 535 census areas.

Oddly enough, the most universally seen bird is an immigrant to the United States, introduced into this country from Europe in 1890. For in 464 of the 535 census areas, the starling made his appearance, with a grand total of 2,163,852 individuals.

Perhaps more pleasing news than that of the starling's success is the counting of 1,043,525 mallard ducks during the census. This fine game bird was seen in 370 of the census areas.

At the other end of the scale, only one individual was seen of each of 25 species. Some of these birds are hard to find at any season of the year, such as the gyrfalcon of the Arctic and Wurdemann's heron of the Florida Keys. Others, like the black tern and the wood peewee, are abundant in the warm seasons but should now all be far south of the border. These midwinter rarities are the spice of the Christmas bird count!

Science News Letter, January 4, 1958